The Impact of Individualized Cognitive Training on Quality of Life and Medication Adherence in Adults with HIV-Associated Neurocognitive Disorder

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Presenter's Disclosures

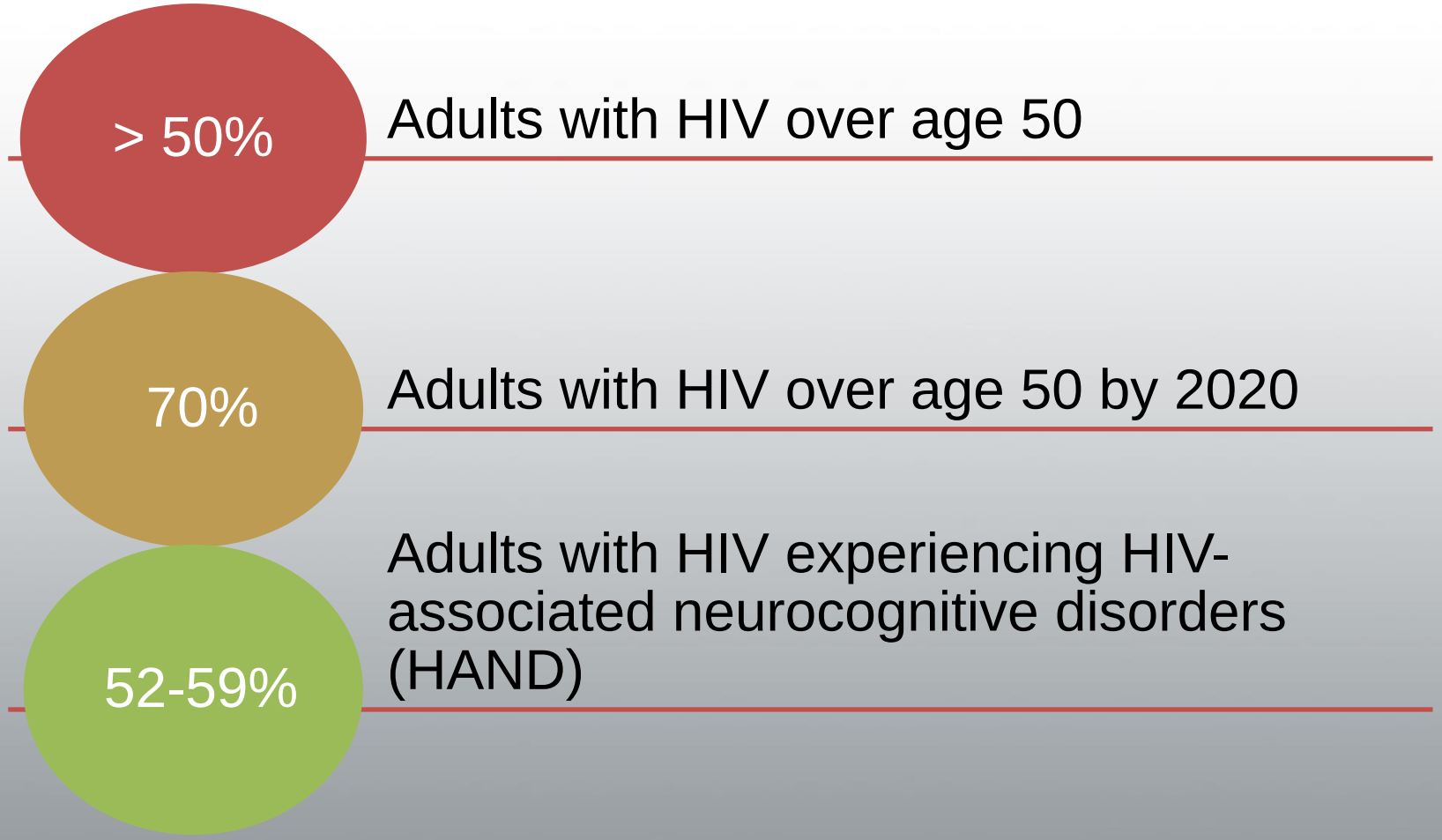
- I have no financial disclosure or conflicts of interest with the presented information in this presentation.

- Grant Information: NIH/NINR R21-award (Vance, PI: 1R21NR016632-01) titled: "Individualized-Targeted Cognitive Training n Older Adults with HAND"

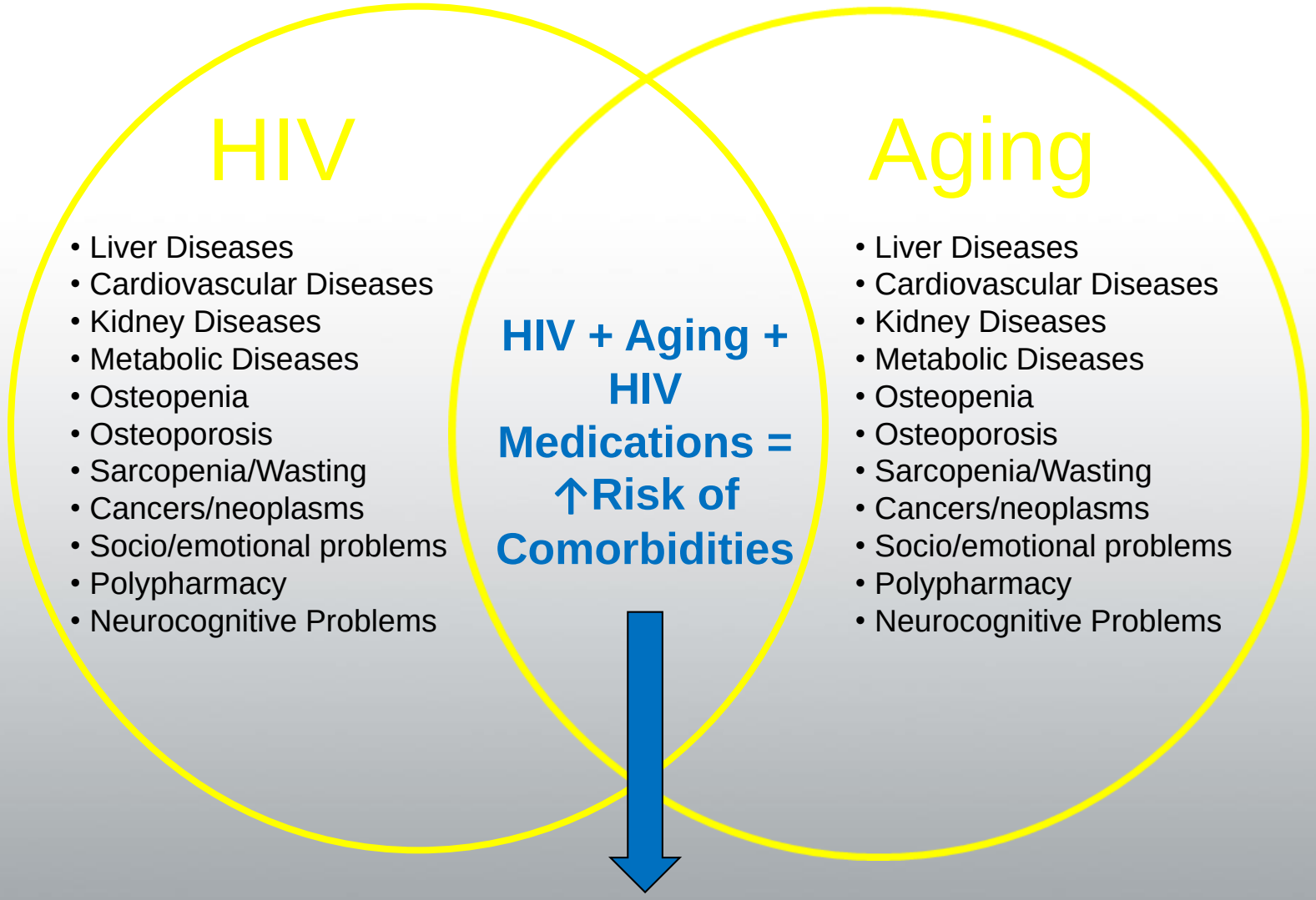
Objectives

1) Identify HAND using Frascati criteria.
2) Explain speed of processing training and its benefits on cognition and everyday function.
3) Explain how cognitive function relates to ART adherence.
4) Compare the impact of speed of processing training and individualized cognitive training on health-related outcomes and ART adherence.

HIV and Aging



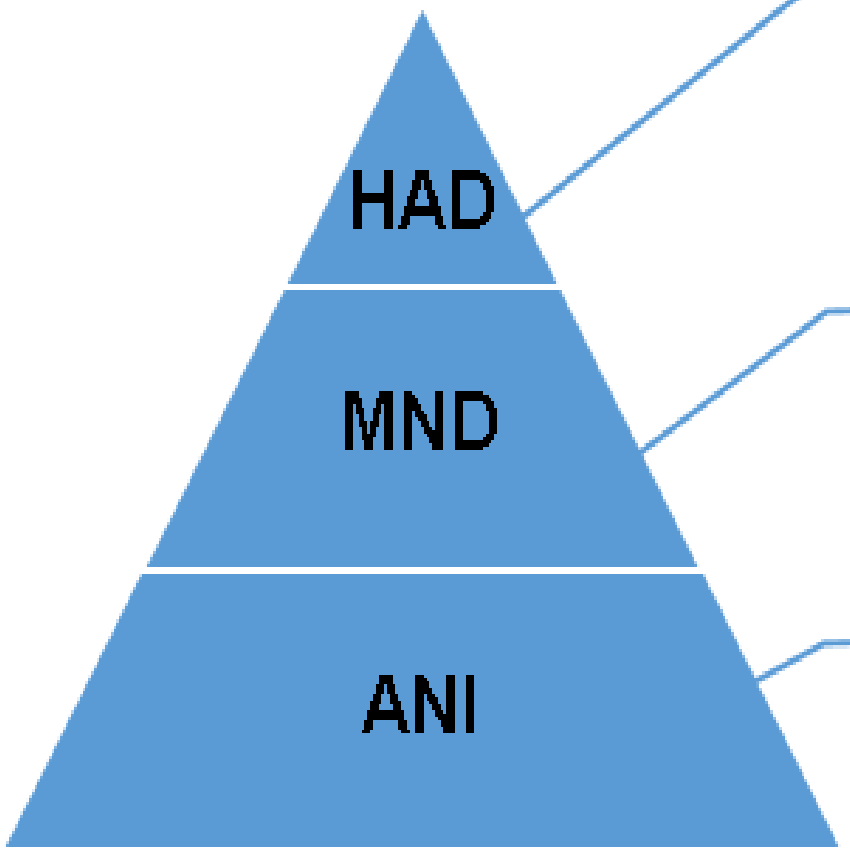
Heaton, R. K., Clifford, D. B., Franklin, D. R., Woods, S. P., Ake, C., … Grant, I. (2010). HIV-associated neurocognitive disorders persist in the era of potent antiretroviral therapy: CHARTER Study. *Neurology*, *75*(23), 2087–2096. https://doi.org/10.1212/wnl.0b013e318200d727



With the growing numbers of older adults with HIV, this is a concern for nurses and the healthcare system.

Vance, D. E. (2010). Aging with HIV: Clinical considerations on an emerging population. *American Journal of Nursing, 110*(3), 42-47.

Frascati Criteria



HIV-Associated Dementia – impairment in two cognitive domains with performance at least 2 SD below the norm with marked impairment in everyday functioning

Mild Neurocognitive Disorder – impairment in two cognitive domains with performance at least 1 SD below the norm with some impairment in everyday functioning

Asymptomatic Neurocognitive Impairment – impairment in two cognitive domains with performance at least 1 SD below the norm with no impairment in everyday functioning

Heaton, R. K., Franklin, D. R., Ellis, R. J., McCutchan, J. A., Letendre, S. L., LeBlanc, S., … Grant, I. (2011). HIV-associated neurocognitive disorders before and during the era of combination antiretroviral therapy: Differences in rates, nature, and predictors. *Journal of NeuroVirology*, *17*(1), 3–16. https://doi.org/10.1007/s13365-010-0006-1

Speed of Processing

Speed of Processing and HIV

- In a meta-analysis of 41 HIV neurocognitive studies from both the pre/post HAART era, speed of processing was among the cognitive domains demonstrating the greatest decline from early to late stages of HIV for all ages.
- A 2014 study of 186 adults with HIV have found that speed of processing “fully mediated the effects of age on learning, memory, and executive functioning and partially mediated the effect of major depression disorder on learning and memory” (Fellows et al., 2014, p. 806).
- Electrophysiological studies already indicate that adults who receive speed of processing training, compared to controls, experience increased N2pc and P3b amplitudes which is reflective of capacity enhancement and attentional allocation (O’Brien et al, 2013).

Speed of Processing Training

- This speed of processing training protocol has been used to improve the rate at which normal, community-dwelling older adults process information (Vance, Dawson, Wadley, Edwards, Roenker, Rizzo, & Ball, 2007).
- It has been shown to improve driving performance and measures of everyday functioning (i.e., The ACTIVE Study; The Accelerate Study).
- Because of its efficacy in older adults, speed of processing training may improve such performance in adults with HIV.

Vance, D. E., Fazeli, P. L., Ross, L. A., Wadley, V., & Ball, K. (2012). The effects of speed of processing training on middle-aged and older adults with HIV. *Journal of the Association of Nurses in AIDS Care, 23*(6), 500-510.

ACTIVE Studies

- NINR/NIA recently (January 14, 2014) announced that SOP training used in the ACTIVE Study enables “older people to maintain their cognitive abilities as they age,” even 10 years after training.
- In the ACTIVE Study, we examined reasoning and memory training as well; however, SOP training was also uniquely found to enhance secondary outcomes:
  - (1) protect against depression and
  - (2) improve self-rated health, internal locus of control, and health-related quality of life.
  - (3) Recent study shows that SOP training reduces the incidence of Alzheimer’s disease over a 10-year period as much as **33%** in older adults (Jerri Edwards – University of South Florida).

ACTIVE Studies

HIV ISSUES	SOP TRAINING BENEFITS
Decreased Speed of Processing	Improved Speed of Processing
Poorer Driving	Improved Driving
Poorer IADL Performance	Improved IADL Performance
Decreased Locus of Control	Improved Locus of Control
Risk for Depression	Protection against Depression
Poorer Self-rated Health	Improved Self-rated Health
Poorer Health-related Quality of Life	Improved Health-related Quality of Life

Vance, D. E., Humphrey, S. C., Nicholson, W. C., & Jablonski-Jaudon, R. (in press). Can speed of processing training ameliorate depressive symptomatology in adults with HIV? *Annals of Depression and Anxiety.*

Cognitive Impairment and ART Adherence

Several studies have as associated cognitive impairments in multiple domains (e.g., executive function, speed of processing, memory) with poor ART adherence.

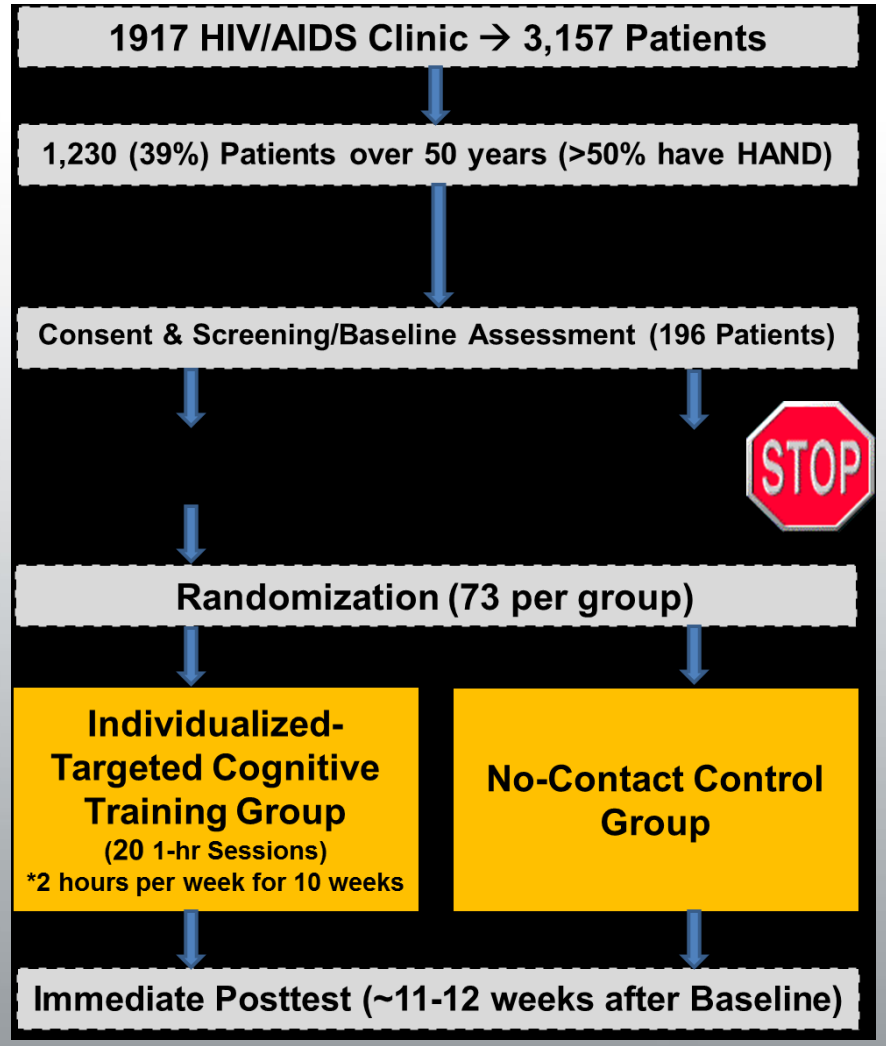
Learning and Memory (Becker, Thames, Woo, Castellon, & Hinkin, 2011); Executive Function and Psychomotor Speed (Hinkin et al., 2004)

****ART adherence is critical for sufficient viral suppression which reduces the risk of transmitting HIV.****

THE TRAINING ON PURPOSE STUDY (TOPS)

Thus, a hierarchy based upon Wicken's Model of Information Processing and the Diminished Speed of Processing Theory is used to determine the areas in which cognitive training will be administered.

According to Wicken's Model of Information Processing, attentional processes underlie other basic cognitive processes including memory, executive functioning, psychomotor functioning, et cetera, and thus should be primary candidates for remediation.



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"Individualized-Targeted Cognitive Training n Older Adults with HAND".

Measures of Psychological Outcomes

Measure	Outcome Variable
The Internal Locus of Control	Internal Locus of Control
Centers for Epidemiological Studies- Depression (CES-D)	Depression
Cognitive Failures	Self-Rates Neurocognitive Health
Simplified Medication Adherence Questionnaire	Medication Adherence

Results

ANOVA – Psychological Outcomes Post-Intervention between Active and No-Contact Groups (N = 87)

	Variable	*df*	*F*	*p*	Partial η^2
Group 1 – Active Training (n = 48)	Locus of Control	1	10.17	.003	.216
	Depression	1	44.56	<.001	.546
	Self-Rated Health	1	43.16	<.001	.552
Group 2 – No Contact (n = 39)	Medication Adherence	1	65.05	<.001	.650

Conclusion

Compared to individualized cognitive training, speed of processing training may be a better approach to improving neurocognitive and psychological outcomes in adults with HIV.

- Speed of processing training has consistently shown to improve speed of processing ability and psychological outcomes in adults with HIV.
- Speed of processing training may be used with other therapies that may augment these effects.
- Speed of processing training is promising for reducing and/or reversing symptoms of HAND.

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